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Approved For Release 2002/01/02 : CIA-RDP78B04747A002500030003-9

RESEARCH AND DEVELOPMENT PROJECT APPROVAL REQUEST

I. Identification

A study is proposed to determine the feasibility of developing a "Light Amplifying Screen" utilizing dipolar suspension. The project will be conducted with [REDACTED] at the [REDACTED] level and is programmed for Fiscal Year 1965 under Category VI, "Other Developments". More specifically this study is comprehended under the subcategory titled "Optical Dipoles".

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II. Objectives

The purpose of this program is to study the feasibility of utilizing a dipolar suspension for a high-intensity, dynamic display of highly magnified, projected images. (The particular technique proposed utilizes a proprietary application of optical dipoles.)

After feasibility has been established, a prototype light amplifying screen will be constructed and tested. This screen may have a direct application to present viewers.

There are many questions that must be answered before it is possibly to say that such a device will have a direct application to present viewing devices. The main goal of the study is to determine the level of energy transmitted by the film that is required to control the dipole suspension. That is, with this type of system, will less energy be required to pass through the film than with present systems?

III. Background

Present viewing systems are limited by the amount of energy that must pass through the imagery that is being projected onto the screen. Since more light per unit area is needed as magnification is increased, magnification is limited by the heat absorbed in the emulsion. One way to overcome this limit would be to develop a screen that would control a bright light source proportionally to a weak image falling on it. It is felt that the [REDACTED] proposal describes a technique which could be used to develop a screen of this type.

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IV. Technical Specifications

The dipole screen is constructed so that an electric field may be applied across the screen and the aligning dipoles allow light to pass through the screen. If ultraviolet illumination is projected onto the screen, the dipoles are ionized and the ions migrate to the faces

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where they shield the electric field. The space thus illuminated is free of the electric field and the dipoles in this area are returned to random orientation by Brownian movement. This random orientation prevents the transmission of light through the screen at this point and this portion of the screen appears dark. Thus if one projects a negative film on the screen, its positive will be reproduced.

An auxiliary light source, in the visible range, is flooded on the screen, thus increasing the brightness of the image projected by ultraviolet. Only enough energy to activate the dipoles must be transmitted by the film. The high-intensity light that is necessary for high-magnification is not projected through the film but from the auxiliary source.

The purpose of this study is to determine whether this principle offers a gain over existing systems. In order to answer the main question, the following should first be determined:

- A. What level of energy is needed to control the dipole suspension?
- B. How does the auxiliary illumination affect the dipole suspension?
- C. How much energy is lost after it is transmitted through the film and before it causes the dipoles to react?
- D. How fast will the dipoles react after illuminated and how fast will they return to their original state?
- E. Is there any migration of the image after it has been formed?
- F. What is the quality of the image?
 1. The Modulation Transfer Function.
 2. The density range.
 3. The density discrimination.

It is anticipated that the study proposed [REDACTED] will provide the comprehensive experimental data required to answer these questions.

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V. Contract and Financial Arrangements

This contract should be accomplished under a [REDACTED] cost-type contract with [REDACTED] for the development and testing of a breadboard light amplifying screen. The delivery of the final report is scheduled for six months after

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the actual award of contract. This contract is considered sole source because of the corporation's proprietary development work in this field.

VI. Security

This contract is to be negotiated on [REDACTED] Confidential basis. The required security measures are not in effect at the contractor's plant; however, appropriate company officers have Secret clearances.

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